

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		0104-0389P U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 10/089848
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/SE00/01945	October 6, 2000	October 6, 1999
TITLE OF INVENTION FEMUR FIXTURE AND SET OF FEMUR FIXTURES		
APPLICANT(S) FOR DO/EO/US ALBREKTSSON, Tomas; JACOBSSON, Magnus; MACDONALD, Warren; CARLSSON, Lars; WENNERBERG, Stig		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
<p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39 (1).</p> <p>4. <input type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ul style="list-style-type: none"> a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). WO 01/24738 b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). </p> <p>6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)) <ul style="list-style-type: none"> a. <input type="checkbox"/> is transmitted herewith. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4) </p> <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)). <ul style="list-style-type: none"> a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. </p> <p>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p>		
Items 11. to 20. below concern document(s) or information included:		
<p>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98, Form PTO-1449(s), and International Search Report (PCT/ISA/210) with 0 cited document(s).</p> <p>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input checked="" type="checkbox"/> A FIRST preliminary amendment.</p> <p>14. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</p> <p>15. <input type="checkbox"/> A substitute specification.</p> <p>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825.</p> <p>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</p> <p>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</p> <p>20. <input checked="" type="checkbox"/> Other items or information: <ul style="list-style-type: none"> 1.) PCT/IB/308 2.) PCT/IPEA/409 3.) Four (4) sheets of Formal Drawings </p>		

APPLICATION NO (if known, see 37 CFR 1.5) 10 NEW 089848	INTERNATIONAL APPLICATION NO PCT/SE00/01945	ATTORNEY'S DOCKET NUMBER 0104-0389P	
<p>21. <input checked="" type="checkbox"/> The following fees are submitted.</p> <p>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5):</p> <p>Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. \$1,040.00</p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00</p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO. \$740.00</p> <p>International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00</p> <p>International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4). \$100.00</p> <p>ENTER APPROPRIATE BASIC FEE AMOUNT =</p> <p>Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).</p>		CALCULATIONS PTO USE ONLY	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total Claims	37 - 20 =	17	X \$18.00 \$ 306.00
Independent Claims	1 - 3 =	0	X \$84.00 \$ 0
MULTIPLE DEPENDENT CLAIM(S) (if applicable)		None	+ \$280.00 \$ 0
		TOTAL OF ABOVE CALCULATIONS	\$ 1436.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.			\$ 0
		SUBTOTAL	\$ 1436.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		+	\$ 0
		TOTAL NATIONAL FEE	\$ 1436.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property		+	\$ 0
		TOTAL FEES ENCLOSED	\$ 1436.00
		Amount to be: refunded	\$
		charged	\$
<p>a. <input checked="" type="checkbox"/> A check in the amount of \$ 1436.00 to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>02-2448</u>.</p>			
<p>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>Send all correspondence to: Birch, Stewart, Kolasch & Birch, LLP or Customer No. 2292 P.O. Box 747 Falls Church, VA 22040-0747 (703) 205-8000</p> <p>Date: <u>April 4, 2002</u></p> <p>By <u>Joe McKinney Murcy</u> Joe McKinney Murcy, #32,334</p>			



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OB/1302
PATENT
0104-0389P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: ALBREKTSSON, Tomas et al.

Int'l. Appl. No.: PCT/SE00/01945

Appl. No.: 10/089,848 Group:

Filed: April 4, 2002 Examiner:

For: FEMUR FIXTURE AND SET OF FEMUR FIXTURES

PRELIMINARY AMENDMENT

BOX PATENT APPLICATION

Assistant Commissioner for Patents
Washington, DC 20231

May 31, 2002

Sir:

The following Preliminary Amendments and Remarks are respectfully submitted in connection with the above-identified application.

IN THE CLAIMS:

Please amend the claims as follows:

49. (AMENDED) The femur fixture as claimed in claim 42, wherein said connecting section is at least partly provided with a smooth surface.

51. (AMENDED) The femur fixture as claimed in claim 42, wherein one or more self-tapping cutting recesses are provided at least in part on said connecting section.

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62. (AMENDED) The femur fixture as claimed in claim 59, wherein the height of the screw thread profile on the frusto-conical proximal section is no greater than 0.3 mm.

63. (AMENDED) The femur fixture as claimed in claim 59, wherein the screw thread profile on the frusto-conical proximal section is formed by the turns of one or more screw threads.

64. (AMENDED) The femur fixture as claimed in claim 58, wherein said circumferentially oriented roughness is in the form of circumferential beads.

REMAKRS

Claims 38-74 are now present in the application. Claims 49, 51, 62-64 have been amended. Claim 38 is independent.

Favorable action on the above-identified application is respectfully requested.

In the event there are any matters remaining in this application, the Examiner is invited to contact Paul C. Lewis, Registration No. 43,368 at (703) 205-8000 in the Washington, D.C. area.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By Paul C. Lewis
Joe McKinney Muncy
F. Reg. No. 32,334 #43,368

KM/PCL/cl

P. O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

Attachment: Version with Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims have been amended as follows:

49. (AMENDED) The femur fixture as claimed in claim [46] 42, wherein said connecting section is at least partly provided with a smooth surface.

51. (AMENDED) The femur fixture as claimed in claim [52] 42, wherein one or more self-tapping cutting recesses are provided at least in part on said connecting section.

62. (AMENDED) The femur fixture as claimed in claim [60] 59, wherein the height of the screw thread profile on the frusto-conical proximal section is no greater than 0.3 mm.

63. (AMENDED) The femur fixture as claimed in claim [60] 59, wherein the screw thread profile on the frusto-conical proximal section is formed by the turns of one or more screw threads.

64. (AMENDED) The femur fixture as claimed in claim [59] 58, wherein said circumferentially oriented roughness is in the form of circumferential beads.

PATENT
0104-0389P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: ALBREKTSSON, Thomas et al.

Int'l. Appl. No.: PCT/SE00/01945

Appl. No.: New Group:

Filed: April 4, 2002 Examiner:

For: FEMUR FIXTURE AND SET OF FEMUR
FIXTURES

PRELIMINARY AMENDMENT

BOX PATENT APPLICATION

Assistant Commissioner for Patents
Washington, DC 20231

April 4, 2002

Sir:

The following Preliminary Amendments and Remarks are respectfully submitted in connection with the above-identified application.

AMENDMENTS

IN THE SPECIFICATION:

Please amend the specification as follows:

Before line 1, insert --This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/SE00/01945 which has an International filing date of October 6, 2000, which designated the United States of America.--

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IN THE CLAIMS:

Please cancel claims 1 through 37 without prejudice or disclaimer to the subject matter contained therein.

Please add the following new claims:

--38. (New) A femur fixture for a hip-joint prosthesis, comprising an intraosseous anchoring structure of a generally circular cross-section for screwing laterally into a complementary bore drilled laterally into the neck of a femur after resection of the femur head to an anchored position, the intraosseous anchoring structure having a proximal end, a distal end, a relatively short frusto-conical proximal section at the proximal end, and a proximal cylindrical section having a screw thread profile thereon and extending towards the distal end from the frusto-conical proximal section, the frusto-conical proximal section and the proximal cylindrical section each being dimensioned so as to bear against the cortex of the femur neck when the intraosseous anchoring structure is in the anchored position.

39. (New) The femur fixture as claimed in claim 38, wherein the intraosseous anchoring structure is so dimensioned that its distal end projects through the lateral cortex of the femur when the intraosseous anchoring structure is in the anchored position.

40. (New) The femur fixture as claimed in claim 38, wherein the intraosseous anchoring structure further has a distal cylindrical section having a screw thread profile thereon and extending towards the proximal cylindrical section from the distal end of the intraosseous anchoring structure, the diameter of said distal cylindrical section being less than the diameter of said proximal cylindrical section.

41. (New) The femur fixture as claimed in claim 40, wherein the screw thread profiles of said proximal and distal cylindrical sections are essentially the same.

42. (New) The femur fixture as claimed in claim 40, wherein said intraosseous anchoring structure further comprises a tapered connecting section provided between and interconnecting said proximal and distal cylindrical sections.

43. (New) The femur fixture as claimed in claim 42, wherein said connecting section has a frusto-conical shape which at one end has a base diameter essentially equal to the diameter of said proximal cylindrical section, and at the other end has a top diameter essentially equal to the diameter of said distal cylindrical section.

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44. (New) The femur fixture as claimed in claim 42, wherein said connecting section has a flank angle in the range of 15°-45°.

45. (New) The femur fixture as claimed in claim 42, wherein said connecting section is at least partly provided with a blasted surface.

46. (New) The femur fixture as claimed in claim 42, wherein said connecting section is at least partly provided with a circumferentially oriented roughness.

47. (New) The femur fixture as claimed in claim 46, wherein said circumferentially oriented roughness has a height less than that of the screw thread profiles of said proximal and distal cylindrical sections.

48. (New) The femur fixture as claimed in claim 46, wherein the height of said circumferentially oriented roughness is no greater than 0.3 mm.

49. (New) The femur fixture as claimed in claim 46, wherein said connecting section is at least partly provided with a smooth surface.

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50. (New) The femur fixture as claimed in claim 42, wherein the entire surface of said connecting section is smooth.

51. (New) The femur fixture as claimed in claim 52, wherein one or more self-tapping cutting recesses are provided at least in part on said connecting section.

52. (New) The femur fixture as claimed in claim 38, wherein said frusto-conical proximal section at an end thereof interfacing said proximal cylindrical section presents a diameter essentially equal to the diameter of said proximal cylindrical section.

53. (New) The femur fixture as claimed in claim 38, wherein said frusto-conical proximal section has a flank angle in the range of 8-15°.

54. (New) The femur fixture as claimed in claim 38, wherein the frusto-conical proximal section has an axial extent in the range of 5-10 mm.

55. (New) The femur fixture as claimed in claim 38, wherein the frusto-conical proximal section has a proximal diameter in the range of 18-30 mm.

56. (New) The femur fixture as claimed in claim 38, wherein the frusto-conical proximal section is at least partly provided with a roughened surface.

57. (New) The femur fixture as claimed in claim 56, wherein said roughened surface is at least partly a blasted surface.

58. (New) The femur fixture as claimed in claim 56, wherein said roughened surface is at least partly provided with a circumferentially oriented roughness.

59. (New) The femur fixture as claimed in claim 58, wherein said circumferentially oriented roughness is in the shape of a screw thread profile.

60. (New) The femur fixture as claimed in claim 59, wherein the screw thread profile of said frusto-conical proximal section differs from the screw thread profiles of said proximal cylindrical section.

61. (New) The femur fixture as claimed in claim 60, wherein the screw thread profile of said frusto-conical proximal section has a height less than the screw thread profile of said proximal cylindrical section.

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62. (New) The femur fixture as claimed in claim 60, wherein the height of the screw thread profile on the frusto-conical proximal section is no greater than 0.3 mm.

63. (New) The femur fixture as claimed in claim 60, wherein the screw thread profile on the frusto-conical proximal section is formed by the turns of one or more screw threads.

64. (New) The femur fixture as claimed in claim 59, wherein said circumferentially oriented roughness is in the form of circumferential beads.

65. (New) The femur fixture as claimed in claim 64, wherein said circumferential beads has a height less than that of the screw thread profile of said proximal cylindrical section.

66. (New) The femur fixture as claimed in claim 64, wherein the height of said circumferential beads is no greater than 0.3 mm.

67. (New) The femur fixture as claimed in claim 38, further comprising a head section for supporting a ball component of the hip-joint prosthesis, said head section comprising a collar section having a distal surface abutting said intraosseous anchoring structure.

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68. (New) The femur fixture as claimed in claim 67, wherein said distal surface is inclined inwardly towards the body of the collar section.

69. (New) The femur fixture as claimed in claim 68, wherein said distal surface is inclined inwardly at an inclination angle within the range of 10°-20.

70. (New) The femur fixture as claimed in claim 67, wherein said distal surface is concave.

71. (New) The femur fixture as claimed in claim 67, wherein said distal surface is provided with radially spaced circular beads.

72. (New) The femur fixture as claimed in claim 71, wherein said circular beads have a height in the range of 0.1-0.5.

73. (New) A set of femur fixtures according to claim 38, wherein the frusto-conical proximal section and the proximal cylindrical section of each fixture in the set have different dimensions, whereby the fixture in the set having the frusto-conical proximal section and the proximal cylindrical section of correct size for abutting the cortex of the femur neck of a particular patient can be selected for use in that patient.

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74. (New) A set of femur fixtures according to claim 40, wherein the distal cylindrical sections of all fixtures in the set have the same dimension, and the frusto-conical proximal section and the proximal cylindrical section of each fixture in the set have different dimensions, whereby the fixture in the set having the frusto-conical proximal section and the proximal cylindrical section of correct size for abutting the cortex of the femur neck of a particular patient can be selected for use in that patient.--

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REMARKS

The specification has been amended to provide a cross-reference to the previously filed International Application.

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
Joe McKinney Muncy, #32,334

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0104-0389P

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Attachment: VERSION WITH MARKINGS TO SHOW CHANGES MADE

(Rev. 02/21/02)

Docket No. 0104-0389P

VERSION WITH MARKINGS TO SHOW CHANGES MADE

The claims have been amended as follows:

Claims 1 through 37 have been cancelled and new claims 38 to 74 have been added.

(Rev. 11/13/01)

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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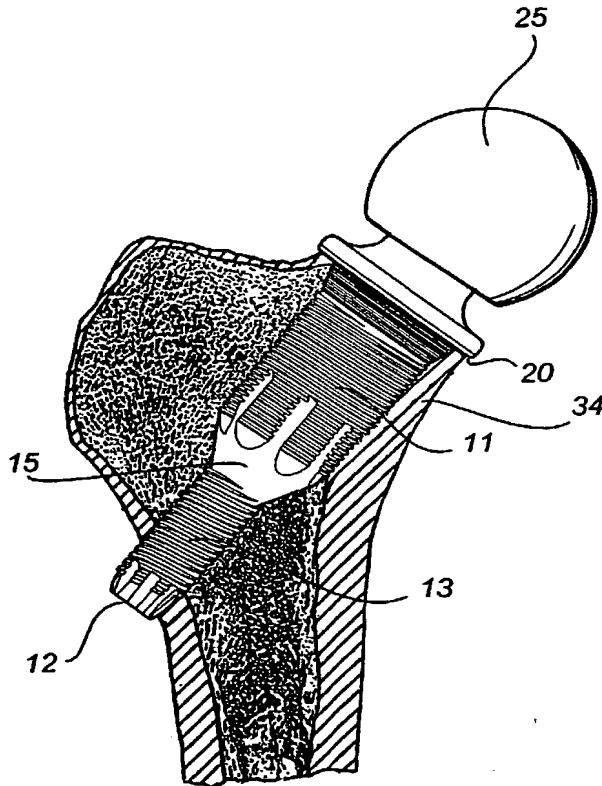
(81) Designated States (*national*): AE, AG, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KR (utility model), KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(71) Applicant (*for all designated States except US*): **ASTRAZENECA AB** [SE/SE]; S-151 85 Södertälje (SE).

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian

[Continued on next page]

(54) Title: FEMUR FIXTURE AND SET OF FEMUR FIXTURES



(57) Abstract: A femur fixture (1) for a hip-joint prosthesis comprising an intraosseous anchoring structure (3) of a generally circular cross-section for screwing laterally into a complementary bore drilled laterally into the neck of a femur after resection of the femur head to an anchored position. The intraosseous anchoring structure (3) has a proximal end, a distal end, a relatively short frusto-conical proximal section (18) at the proximal end, and a proximal cylindrical section (11) having a screw thread profile thereon. The proximal cylindrical section (11) extends from the frusto-conical proximal section towards the distal end of the anchoring structure (3). The frusto-conical proximal section (18) and the proximal cylindrical section (11) each being dimensioned so as to bear against the cortex of the femur neck when the intraosseous anchoring structure (3) is in the anchored position. The invention also relates to a set of such femur fixtures, wherein the frusto-conical proximal section (18) and the proximal cylindrical section (11) of each fixture (1) in the set have different dimensions, whereby the fixture in the set having the frusto-conical proximal section (18) and the proximal cylindrical section (11) of correct size for abutting the cortex of the femur neck of a particular patient can be selected for use in that patient.

WO 01/24738 A1

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FEMUR FIXTURE AND SET OF FEMUR FIXTURES

Field of the Invention

The present invention relates to a femur fixture for a hip-joint prosthesis comprising an intraosseous anchoring structure of a generally circular cross-section 5 adapted for screwing laterally into a complementary bore drilled laterally into the neck of a femur after resection of the femur head to an anchored position. The invention also relates to a set of such femur fixtures.

10 Background of the Invention

A femur fixture of the aforementioned type is disclosed in Applicant's prior International patent application publication WO93/16663. In this femur fixture the intraosseous structure has a screw threaded cylindrical section at the proximal end. The use of a cylindrical proximal section in the intraosseous structure of the femur fixture of WO93/16663 enables the threads thereon to engage with the cortex of the femur neck and increase the fixation strength of the femur fixture in the femur. However, the threads at the terminal proximal section of the cylindrical section do not register in the medial cortex of the femur neck at the resected surface. This is due to the cortex of the femur neck flaring outwardly adjacent the resected surface.

25 This lack of loading of the cortex at the resected surface of the femur by the intraosseous anchoring structure of the femur fixture can lead to bone resorption at the resected surface. This situation is not able to be simply addressed by increasing the diameter of the cylindrical proximal section of the intraosseous anchoring structure of the WO93/16663 femur fixture since it would result in the threads of the cylindrical proximal section puncturing the cortex in the body of the femur neck or

being dangerously close to puncturing the cortex due to the trumpet-like shape of the cortex in the femur neck.

Summary of the Invention

5 Thus, the object of the present invention is to provide an improved femur fixture where the above mentioned drawback is addressed.

10 This and other objects are achieved according to the present invention by providing a femur fixture having the features defined in the independent claim. Preferred embodiments are defined in the dependent claims.

15 According to the present invention there is provided a femur fixture for a hip-joint prosthesis, comprising an intraosseous anchoring structure of a generally circular cross-section for screwing laterally into a complementary bore drilled laterally into the neck of a femur after resection of the femur head to an anchored position. The intraosseous anchoring structure has a proximal end, a distal end, a relatively short frusto-conical proximal section at the proximal end, and a proximal cylindrical section having a screw thread profile thereon and extending towards the distal end from the frusto-conical proximal section, the frusto-conical proximal section and the proximal cylindrical section each being dimensioned so as 20 to bear against the cortex of the femur neck when the intraosseous anchoring structure is in the anchored position.

25 Thus, the present invention is based on the advantageous idea of providing a femur fixture of the above-mentioned type with a relatively short frusto-conical proximal section at the proximal end of the intraosseous anchoring structure.

30 The provision of a relatively short frusto-conical proximal section at the proximal end of the intraosseous anchoring structure thus loads the cortex of the femur neck adjacent the resected surface and the proximal cylindrical section loads the cortex in the body of the fe- 35

mur neck. Thereby, an improved anchorage of the femur fixture in the femur of the patient can be obtained.

The frusto-conical section preferably has a flank angle in the range of 8-15°, preferably in the range 10-5 13°, even more preferably approximately 12°.

According to preferred embodiments of the invention the frusto-conical section has an axial extent in the range of 5-10 mm. Preferably, the axial extent is approximately 8 mm.

10 Advantageously, the proximal end of the frusto-conical proximal section has a diameter in the range of 18-30 mm.

15 Advantageously, the distal end of the frusto-conical proximal section, i.e. the end interfacing the proximal cylindrical section, has essentially the same diameter as the proximal cylindrical section. Thus, there will be no sharp edges in the transition area between the frusto-conical proximal section and the proximal cylindrical section that could induce undesired stresses.

20 According to preferred embodiments of the invention the frusto-conical section has at least partly a roughened surface. This improves the integration of the frusto-conical section with the cortex (termed "osseointegration" in the art). The roughening may be 25 achieved by grit blasting, etching or machining, or by a combination of one or more of these roughening techniques.

30 Alternatively or additionally, the frusto-conical proximal section could be provided with a circumferentially oriented roughness, preferably machined. Such circumferentially oriented roughness could for instance be provided in the form of grooves, beads, tracks, or screw threads. The provision of such a circumferentially oriented roughness would improve the short term anchorage 35 capacity of the intraosseous anchoring structure due to the engagement of the circumferentially oriented roughness with the cortex of the femur neck adjacent the re-

sected surface, as well as even further promote the osseointegration process.

According to an embodiment of the invention, the frusto-conical proximal section is provided with a screw 5 thread profile similar to that of the proximal cylindrical section.

According to preferred embodiments of the invention, the frusto-conical proximal section has a screw thread profile of a height less than the screw thread profile of 10 the proximal cylindrical section. Preferably, the height of the screw thread profile on the frusto-conical proximal section is no greater than 0.3 mm (microthreads), more preferably in the range 0.1-0.25 mm, and even more preferably approximately 0.2 mm.

15 According to another embodiment of the invention, the frusto-conical proximal section is provided with circumferential beads of a height less than the screw thread profile of the proximal cylindrical section. Preferably, the height of the beads is no greater than 0.3 mm, more 20 preferably in the range 0.1-0.25 mm, and even more preferably approximately 0.2 mm.

According to preferred embodiments of the invention, the intraosseous anchoring structure is dimensioned such 25 that the distal end of the anchoring structure projects through the lateral cortex of the femur when the intraosseous anchoring structure is in the anchored position. This arrangement, together with the inventive features of having a frusto-conical proximal section at the proximal end of the anchoring structure, provides a 30 strong anchorage of the anchoring structure in the cortical bone tissue of the femur.

Advantageously, the intraosseous anchoring structure further has a screw threaded, distal cylindrical section, which extends from the distal end of the intraosseous anchoring structure towards the proximal cylindrical section. The diameter of the distal cylindrical section is 35 less than the diameter of said proximal cylindrical sec-

tion. Preferably, the screw thread profiles of the proximal and distal cylindrical sections are essentially the same.

According to an embodiment of the invention, the invention 5 trousseous anchoring structure further comprises a tapered connecting section provided between the proximal and distal cylindrical sections. This tapered connecting section interconnects the proximal and distal cylindrical sections and, preferably, has a frusto-conical shape 10 which at one end has a base diameter essentially equal to the diameter of said proximal cylindrical section, and at the other end has a top diameter essentially equal to the diameter of said distal cylindrical section.

The provision of a tapered connecting section would 15 radically reduce any stresses that might be induced by a sharp, step-wise transition between the cylindrical sections of differing diameters. Further, insertion of the fixture would be facilitated, the short and long term stability of the fixture would be improved, as well as 20 the process of osseointegration between the fixture and the surrounding bone tissue.

Advantageously, the proximal end of the tapered connecting section has essentially the same diameter as the proximal cylindrical section. Likewise, the distal end of 25 the tapered connecting section advantageously has essentially the same diameter as the distal cylindrical section.

According to preferred embodiments of the invention, the diameter of the first cylindrical section is adapted 30 to the actual size and shape of the femur of the particular patient for whom the femur fixture is intended. Thus, the diameter of the first cylindrical section can vary considerably. However, the diameter of the second cylindrical section is preferably dimensioned to be within a 35 short, limited range. Thus, the flank angle of the connecting section may vary in dependence of the actual dimensions of the first and second cylindrical sections.

Preferably, the flank angle can be varied in the range of 10°-50°, and more preferably in the range of 20°-40°.

Preferably, the tapered connecting section is at least partly provided with a roughened surface. This 5 would even further promote the osseointegration process at the transition area between the cylindrical sections. The roughened surface could be achieved through blasting, preferably grit-blasting, etching, or the like. Alternatively or additionally, the surface of the tapered proximal section is provided with a circumferentially oriented 10 roughness, for instance in the form of circumferential beads or screw threads. The height of the beads or screw threads is preferably no greater than 0.3 mm, more preferably in the range of 0.1-0.25 mm, and even more preferably approximately 0.2 mm. 15

According to an embodiment of the invention as hereinafter described, the tapered connecting section is at least in part provided with one or more self-tapping cutting recesses.

According to preferred embodiments of the present 20 invention, femur fixture further comprises a head section. The head section is provided with a collar abutting the tapered proximal section, which collar delimits the insertion of the femur fixture into bone tissue. Preferably, the surface of the collar facing the proximal section is inclined inwardly so as to mate with a resected bone tissue surface that has been given a correspondingly inclined shape. Preferably, the angle of inclination is 25 within the range of 10°-20°, preferably approximately 15°. Alternatively, the surface of the collar facing the proximal section is given a concave shape, so as to mate with a convex bone tissue surface. Thereby, an improved 30 contact between the femur fixture and the bone surface can be obtained.

35 Preferably, said collar surface is provided with radially spaced circular beads or grooves for increasing the stability of the inserted femur fixture and promote

the osseointegration between the femur fixture and the bone tissue. Preferably, these beads have a height in the range of 0.1-0.5 mm, preferably in the range of 0.2-0.4 mm, and even more preferably approximately 0.3 mm.

5 According to a preferred embodiment the present invention there is further provided a set of femur fixtures according to the invention with the frusto-conical proximal section and the proximal cylindrical section of each fixture in the set having different dimensions, whereby
10 the fixture in the set having the frusto-conical and cylindrical sections of correct size for abutting the cortex of the femur neck of a patient can be selected for use in that patient.

According to a preferred embodiment of the invention, there is further provided a set where the frusto-conical proximal section and the proximal cylindrical section of each fixture in the set have different dimensions, while the dimension of the distal cylindrical section is essentially the same for all fixtures in the set.
20 Thereby, the fixture in the set having the frusto-conical and cylindrical sections of correct size for abutting the cortex of the femur neck of a particular patient can be selected for use in that patient.

An exemplary embodiment of the invention will now be described with reference to the accompanying Figures of drawings.

Brief Description of the Accompanying Figures of Drawings

Fig. 1 is a perspective view of a femur fixture for
30 a hip-joint prosthesis in accordance with an embodiment of the invention,

Fig. 2 is an opposite perspective view of the femur fixture shown in Fig. 1,

Fig. 3 is a longitudinal side view of the femur fixture,
35

Fig. 4 is a longitudinal sectional view of the femur fixture,

Fig. 5 is an enlarged fragmentary sectional view showing the tapered proximal section and the head of the femur fixture,

5 Fig. 6 is a bottom view of the femur fixture,
Fig. 7 is a fragmentary sectional view of the collum of the human femur, with a cavity formed therein for reception of the femur fixture, and

10 Fig. 8 is a fragmentary sectional view of the collum of the human femur, with the femur fixture inserted therein.

Description of Exemplary Embodiment

With reference to Figs 1-8, there is shown an integrally formed femur fixture 1 for a hip-joint prosthesis preferably made from commercially pure titanium and consisting of (i) an intraosseous anchoring section 3 of circular cross-section, and (ii) a head section 5. The anchoring section 3 is intended for insertion laterally into a cavity 30 of complementary profile (Fig. 7), said cavity 30 being drilled into the neck of a femur through a resected section 33 made by resection of the head of the femur. The head section 5 of the fixture, which will protrude from the resected section 33 when the intraosseous anchoring section 3 is located in the cavity 30 (Fig. 8), is arranged for supporting a ball 25 of the hip-joint prosthesis which interacts with the anatomical acetabular cavity or an acetabular part of the hip-joint prosthesis where a total hip-joint prosthesis is required.

30 As can be seen in Figs 1-3, the intraosseous anchoring section 3 has proximal and distal cylindrical sections 11, 13 of different outer diameter, with the diameter of the proximal cylindrical section 11 being greater than that of the distal cylindrical section 13. The intraosseous anchoring section 3 further has a tapered terminal distal section 12, contiguous with the distal cylindrical section 13, a frusto-conical connecting section

15 connecting the proximal cylindrical section 11 to the distal cylindrical section 13, and a frusto-conical proximal section 18 connecting the proximal cylindrical section 11 to the head section 5.

5 The proximal cylindrical section 11 presents a screw-threaded outer surface for screwing into an outer bone cavity section 32 of said cavity. The distal cylindrical section 13 also presents a screw-threaded outer surface, for screwing into a narrow drilled hole 31, 10 which is coaxial with said outer cavity section 32. The screw-threads of the proximal cylindrical section 11 have the same pitch and height as those of the distal cylindrical section 13.

15 The major diameters of the screw threads on the proximal and distal cylindrical sections 11, 13 are sized to be greater than the inner diameter of complementary cylindrical sections of the outer cavity section 32 and the drilled hole 31 provided in the cavity 30 of the femur neck (See Fig. 7). Accordingly, the intraosseous anchoring section 3 is able to be anchored in the cavity 30 20 by screwing of the femur fixture 1 into the cavity 30, with the screw threads on the proximal and distal cylindrical sections 11, 13 threading into the bone tissue in the boundary wall of the cavity 30.

25 As seen in Fig. 8, the diameter of the proximal cylindrical section 11 is in fact sized such that the threads thereon register in the peripheral layer of cortical bone 34 in the femur neck, as outlined in WO93/16663 and WO97/25939. The threads on the proximal 30 cylindrical section 11 are thus secured in the stronger cortical bone 34 as opposed to the spongier cancellous bone 35, thereby giving the femur fixture 1 greater fixation in the femur neck. Due to the fact that the femur dimensions can vary from patient to patient, the diameter 35 of the proximal cylindrical section can vary in the range from approximately 16-26 mm (cf. Figs 3 and 8).

As illustrated in Fig. 8, the axial length of the intraosseous anchoring section 3 is such that in the anchored position of the intraosseous anchoring section 3, the distal end 12 thereof projects through the lateral cortex 34 of the femur.

With reference to Figs 3-5, the frusto-conical proximal section 18 also has threads thereon. The height of these threads is 0.2 mm (so-called microthreads) which is less than that of the threads on the proximal and distal cylindrical sections 11, 13. Further, the frusto-conical proximal section 18 is sized so that the microthreads engage with the cortex 34 of the femur neck at the resected surface. In the embodiment described herein, the frusto-conical terminal proximal section 18 has a flank angle of approximately 12°, and an axial extent of approximately 8 mm.

The distal diameter of the proximal section 18 is adapted to the diameter of the neighbouring proximal cylindrical section 11, such that there are no sharp edges in the transition area between the frusto-conical proximal section 18 and the proximal cylindrical section 11. Consequently, the proximal diameter of the frusto-conical proximal section 18 is in the range of approximately 20-30 mm.

The diameter of the distal cylindrical section 13 does not have to be varied in dependence of the femur dimensions of the patient. The diameter of the distal cylindrical section 13 is approximately 11 mm, or within the range of 10-12 mm.

The frusto-conical connecting section 15 interconnects the proximal and distal cylindrical sections 11, 13 to one another. In this embodiment, the diameters at the respective end of the connecting section 15 correspond to the diameters of the proximal and distal cylindrical sections 11, 13, respectively. In other words, the distal end of the connecting section 15 has essentially the same diameter as the distal cylindrical section 13, and the

proximal end of the connecting section 15 has essentially the same diameter as the proximal cylindrical section 11.

As a result of the fact that the diameter of the proximal cylindrical section 11 can be varied between 5 different femur fixtures, while the diameter of the distal cylindrical section 13 is not varied, the dimensions of the connecting section will be varied in accordance with the varying difference in diameter between the proximal cylindrical section 11 and the distal cylindrical section 13. Since the axial extent of the connecting section is kept relatively short, i.e. within the range of approximately 7.5-10.5 mm, the flank angle of the connecting section can vary from approximately 20° for the narrowest fixture alternative, up to approximately 37° 10 for the widest fixture alternative. 15

In the herein described embodiment of the invention, the surface of the frusto-conical connecting section 15 is provided with a grit-blasted surface for promoting the osseointegration between the surface and the surrounding 20 cancellous bone tissue. The surface could also, or alternatively, be provided with a screw thread profile for promoting said osseointegration and improve the anchorage of the femur fixture 1. As a further alternative, the frusto-conical connecting section 15 may be left smooth, 25 even polished.

As can be seen in figs 2 and 3, bridging the boundary between the proximal cylindrical section 11 and the frusto-conical connecting section 15 are a series of 30 equi-spaced, circumferentially-arranged, sharp-edged cutting recesses or notches 14 for self-tapping into a pre-cut outer bone cavity section 32. The cutting recesses 14 each communicate with a channel 16 in the proximal cylindrical section 11 for autologous transplantation of the bone cut by the cutting recesses 14 as the femur fixture 35 1 is screwed into the bore in the femur neck, as detailed in WO97/25939.

Further, bridging the boundary between the distal cylindrical section 13 and the tapered terminal distal section 12 are also a series of short, sharp-edged circumferentially-arranged cutting recesses 17 for the distal cylindrical section 13 to be self-tapped into said drilled, relatively narrow hole 31.

With reference to Figs 1, 7 and 8, the head section 5 of the femur fixture 1 has a collar section 20 and a tapered mounting section 23 for the ball component 25 of the hip-joint prosthesis to be mounted on. The mounting section 23 is provided with a recess 24 for reception of the ball component 25. The collar section 20 delimits the insertion of the intraosseous anchoring section 3 into the bore in the femur neck by abutting with the resected femur section 33 adjacent the opening to the cavity 30. As can be seen in Fig. 5, the distal surface 21 (Fig. 5) is inclined inwardly for mating with a correspondingly inclined bone surface the resected femur section 33 (Fig. 7). The angle of inclination in the embodiment herein described is approximately 15°. Further, as seen in Fig. 6, for improved anchorage and osseointegration, the distal surface 21 of the collar section 20 is provided with radially spaced, circumferential beads 22, said beads having a height of approximately 0.3 mm.

The surgical procedures described in WO93/16663 and WO97/25939 for implanting the femur fixtures disclosed therein can also be adapted for implantation of the femur fixture 1 and as such are incorporated herein by reference.

The anchorage of the femur fixture 1 is primarily reliant on the registration of the threads in the bone of the femur, principally the registration of the threads on the proximal cylindrical section 11 in the cortex 34 of the femur neck and the registration of the threads on the distal cylindrical section 13 in the lateral cortex 34 of the femur. This is in distinction to femur fixtures which

rely on a thrust plate mechanism for their fixation, for example as in GB-A-2033755.

The femur fixture 1 herein described with reference to the accompanying figures can be varied in numerous 5 ways within the scope of the invention. For instance, the femur fixture 1 could be in the form of an assembly in which the component parts are assembled (i) for insertion thereof laterally into the bore as a one-piece structure, as disclosed in WO93/16663, or (ii) by connecting the 10 parts together in the bore, as disclosed in WO93/01769. The femur fixture 1 could also be made from any biocompatible material of strength sufficient to withstand the loads imposed upon it in situ.

It will be appreciated that the invention has been 15 described with reference to an exemplary embodiment and that the invention can be varied in many different ways within the scope of the appended claims. For instance, the implant is not confined to use as a femur fixture for a hip-joint prosthesis. As an example, the implant could 20 take the form of a bone fixation screw. It will further be appreciated that the use in the appended claims of reference numerals from the Figures of drawings is for the purposes of illustration and not to be construed as having a limiting effect on the claims.

CLAIMS

1. A femur fixture (1) for a hip-joint prosthesis, comprising an intraosseous anchoring structure (3) of a generally circular cross-section for screwing laterally into a complementary bore drilled laterally into the neck of a femur after resection of the femur head to an anchored position, the intraosseous anchoring structure (3) having a proximal end, a distal end, a relatively short frusto-conical proximal section (18) at the proximal end, and a proximal cylindrical section (11) having a screw thread profile thereon and extending towards the distal end from the frusto-conical proximal section (18), the frusto-conical proximal section (18) and the proximal cylindrical section (11) each being dimensioned so as to bear against the cortex of the femur neck when the intraosseous anchoring structure (3) is in the anchored position.

2. The femur fixture (1) as claimed in claim 1, wherein the intraosseous anchoring structure (3) is so dimensioned that its distal end projects through the lateral cortex (34) of the femur when the intraosseous anchoring structure (3) is in the anchored position.

3. The femur fixture (1) as claimed in claim 1 or 2, wherein the intraosseous anchoring structure (3) further has a distal cylindrical section (13) having a screw thread profile thereon and extending towards the proximal cylindrical section (11) from the distal end of the intraosseous anchoring structure (3), the diameter of said distal cylindrical section (11) being less than the diameter of said proximal cylindrical section (13).

4. The femur fixture (1) as claimed in claim 3, wherein the screw thread profiles of said proximal and distal cylindrical sections (11, 13) are essentially the same.

5. The femur fixture (1) as claimed in claim 3 or 4, wherein said intraosseous anchoring structure (3) further

comprises a tapered connecting section (15) provided between and interconnecting said proximal and distal cylindrical sections (11, 13).

6. The femur fixture (1) as claimed in claim 5,
5 wherein said connecting section (15) has a frusto-conical
shape which at one end has a base diameter essentially
equal to the diameter of said proximal cylindrical sec-
tion (11), and at the other end has a top diameter essen-
tially equal to the diameter of said distal cylindrical
10 section (13).

7. The femur fixture (1) as claimed in claim 5 or 6,
wherein said connecting section (15) has a flank angle in
the range of 15°-45°, preferably in the range of 20°-40°.

8. The femur fixture (1) as claimed in any one of
15 claims 5-7, wherein said connecting section (15) is at
least partly provided with a blasted surface, preferably
a grit-blasted surface.

9. The femur fixture (1) as claimed in any one of
claims 5-8, wherein said connecting section (15) is at
20 least partly provided with a circumferentially oriented
roughness, preferably in the form of circumferential
beads or screw threads.

10. The femur fixture (1) as claimed in claim 9,
wherein said circumferentially oriented roughness has a
25 height less than that of the screw thread profiles of
said proximal and distal cylindrical sections (11, 13).

11. The femur fixture (1) as claimed in claim 9 or
10, wherein the height of said circumferentially oriented
roughness is no greater than 0.3 mm, preferably in the
30 range of 0.1-0.25 mm, and even more preferably approxi-
mately 0.2 mm.

12. The femur fixture (1) as claimed in any one of
claims 5-11, wherein said connecting section (15) is at
least partly provided with a smooth surface.

35 13. The femur fixture (1) as claimed in any one of
claims 5-7, wherein the entire surface of said connecting
section (15) is smooth.

14. The femur fixture (1) as claimed in any one of claims 5-13, wherein one or more self-tapping cutting recesses (14) are provided at least in part on said connecting section (15).

5 15. The femur fixture (1) as claimed in any one of the preceding claims, wherein said frusto-conical proximal section (18) at an end thereof interfacing said proximal cylindrical section (11) presents a diameter essentially equal to the diameter of said proximal cylindrical section (11).

10 16. The femur fixture as claimed in any one of the preceding claims, wherein said frusto-conical proximal section (18) has a flank angle in the range of 8-15°, preferably in the range of 10-13°, and even more preferably approximately 12°.

15 17. The femur fixture (1) as claimed in any one of the preceding claims, wherein the frusto-conical proximal section (18) has an axial extent in the range of 5-10 mm, preferably approximately 8 mm.

20 18. The femur fixture (1) as claimed in any one of the preceding claims, wherein the frusto-conical proximal section (18) has a proximal diameter in the range of 18-30 mm.

25 19. The femur fixture (1) as claimed in any one of the preceding claims, wherein the frusto-conical proximal section (18) is at least partly provided with a roughened surface.

30 20. The femur fixture (1) as claimed in claim 19, wherein said roughened surface is at least partly a blasted surface, preferably a grit-blasted surface.

21. The femur fixture (1) as claimed in claim 19 or 20, wherein said roughened surface is at least partly provided with a circumferentially oriented roughness.

35 22. The femur fixture (1) as claimed in claim 21, wherein said circumferentially oriented roughness is in the shape of a screw thread profile.

23. The femur fixture (1) as claimed in claim 22, wherein the screw thread profile of said frusto-conical proximal section (18) differs from the screw thread profiles of said proximal cylindrical section (11).

5 24. The femur fixture (1) as claimed in claim 23, wherein the screw thread profile of said frusto-conical proximal section (18) has a height less than the screw thread profile of said proximal cylindrical section (11).

10 25. The femur fixture (1) as claimed in any one of claims 22-24, wherein the height of the screw thread profile on the frusto-conical proximal section (18) is no greater than 0.3 mm, preferably in the range of 0.1-0.25 mm, and even more preferably approximately 0.2 mm.

15 26. The femur fixture (1) as claimed in any one of claims 22-25, wherein the screw thread profile on the frusto-conical proximal section (18) is formed by the turns of one or more screw threads.

20 27. The femur fixture (1) as claimed in claim 21, wherein said circumferentially oriented roughness is in the form of circumferential beads.

28. The femur fixture (1) as claimed in claim 27, wherein said circumferential beads has a height less than that of the screw thread profile of said proximal cylindrical section (11).

25 29. The femur fixture (1) as claimed in claim 27 or 28, wherein the height of said circumferential beads is no greater than 0.3 mm, preferably in the range of 0.1-0.25 mm, and even more preferably approximately 0.2 mm.

30 30. The femur fixture (1) as claimed in any one of the preceding claims, further comprising a head section (5) for supporting a ball component (25) of the hip-joint prosthesis, said head section (5) comprising a collar section (20) having a distal surface (21) abutting said intraosseous anchoring structure (3).

35 31. The femur fixture (1) as claimed in claim 30, wherein said distal surface (21) is inclined inwardly towards the body of the collar section (20).

32. The femur fixture (1) as claimed in claim 31, wherein said distal surface (21) is inclined inwardly at an inclination angle within the range of 10°-20°, preferably approximately 15°.

5 33. The femur fixture (1) as claimed in claim 30, wherein said distal surface (21) is concave.

34. The femur fixture (1) as claimed in any one of claims 30-33, wherein said distal surface (21) is provided with radially spaced circular beads (22).

10 35. The femur fixture (1) as claimed in claim 34, wherein said circular beads have a height in the range of 0.1-0.5 mm, preferably in the range of 0.2-0.4 mm, and even more preferably approximately 0.3 mm.

15 36. A set of femur fixtures according to any one of the preceding claims, wherein the frusto-conical proximal section (18) and the proximal cylindrical section (11) of each fixture (1) in the set have different dimensions, whereby the fixture in the set having the frusto-conical proximal section (18) and the proximal cylindrical section (11) of correct size for abutting the cortex of the 20 femur neck of a particular patient can be selected for use in that patient.

37. A set of femur fixtures according to claim 3, wherein the distal cylindrical sections (13) of all fixtures (1) in the set have the same dimension, and the frusto-conical proximal section (18) and the proximal cylindrical section (11) of each fixture (1) in the set have different dimensions, whereby the fixture in the set having the frusto-conical proximal section (18) and the 30 proximal cylindrical section (11) of correct size for abutting the cortex of the femur neck of a particular patient can be selected for use in that patient.

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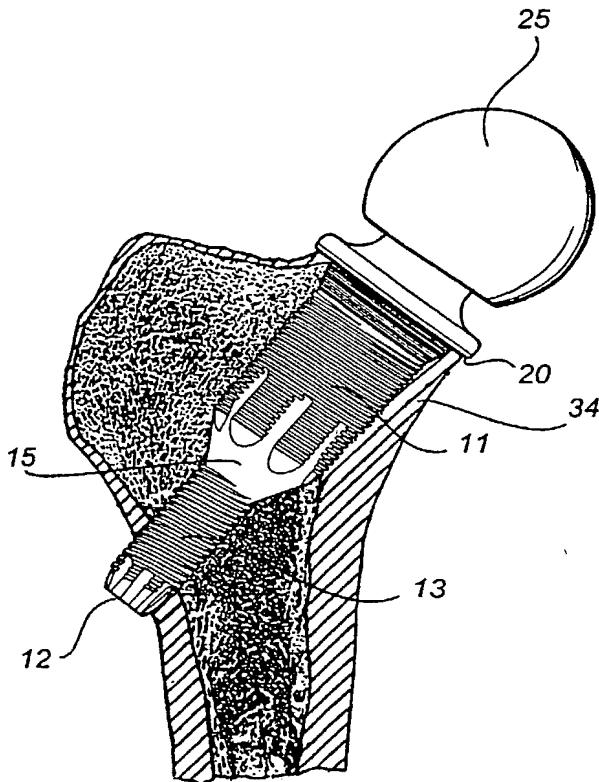
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(54) Title: FEMUR FIXTURE AND SET OF FEMUR FIXTURES



(57) Abstract: A femur fixture (1) for a hip-joint prosthesis comprising an intraosseous anchoring structure (3) of a generally circular cross-section for screwing laterally into a complementary bore drilled laterally into the neck of a femur after resection of the femur head to an anchored position. The intraosseous anchoring structure (3) has a proximal end, a distal end, a relatively short frusto-conical proximal section (18) at the proximal end, and a proximal cylindrical section (11) having a screw thread profile thereon. The proximal cylindrical section (11) extends from the frusto-conical proximal section towards the distal end of the anchoring structure (3). The frusto-conical proximal section (18) and the proximal cylindrical section (11) each being dimensioned so as to bear against the cortex of the femur neck when the intraosseous anchoring structure (3) is in the anchored position. The invention also relates to a set of such femur fixtures, wherein the frusto-conical proximal section (18) and the proximal cylindrical section (11) of each fixture (1) in the set have different dimensions, whereby the fixture in the set having the frusto-conical proximal section (18) and the proximal cylindrical section (11) of correct size for abutting the cortex of the femur neck of a particular patient can be selected for use in that patient.

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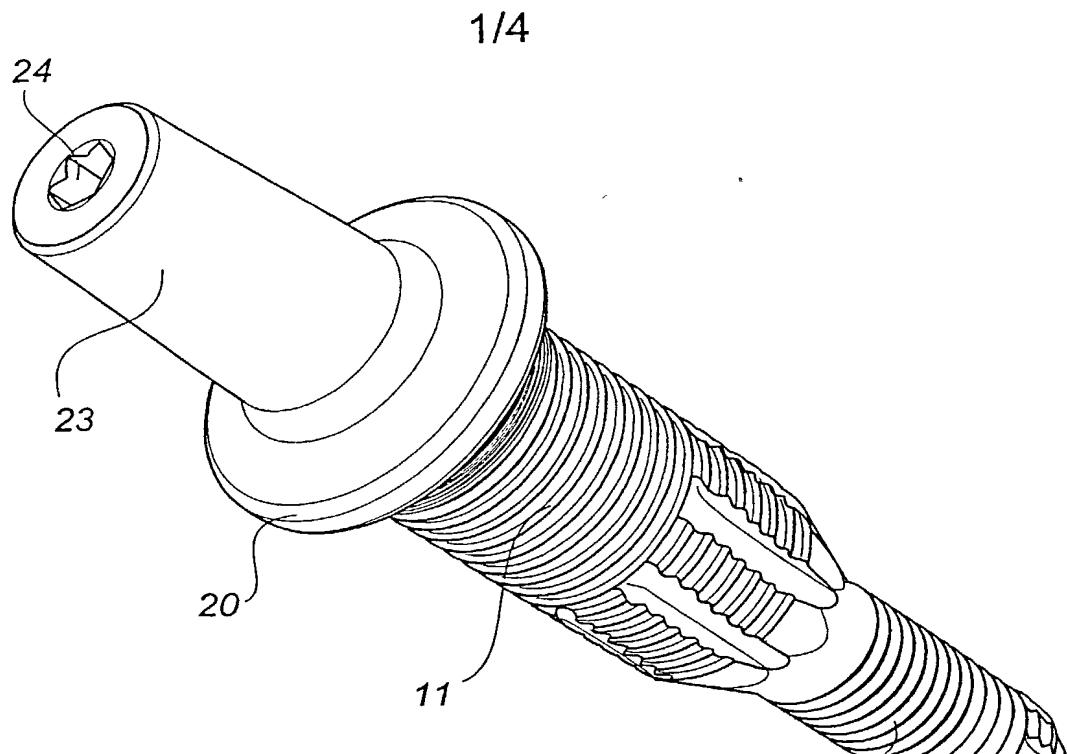


Fig. 1

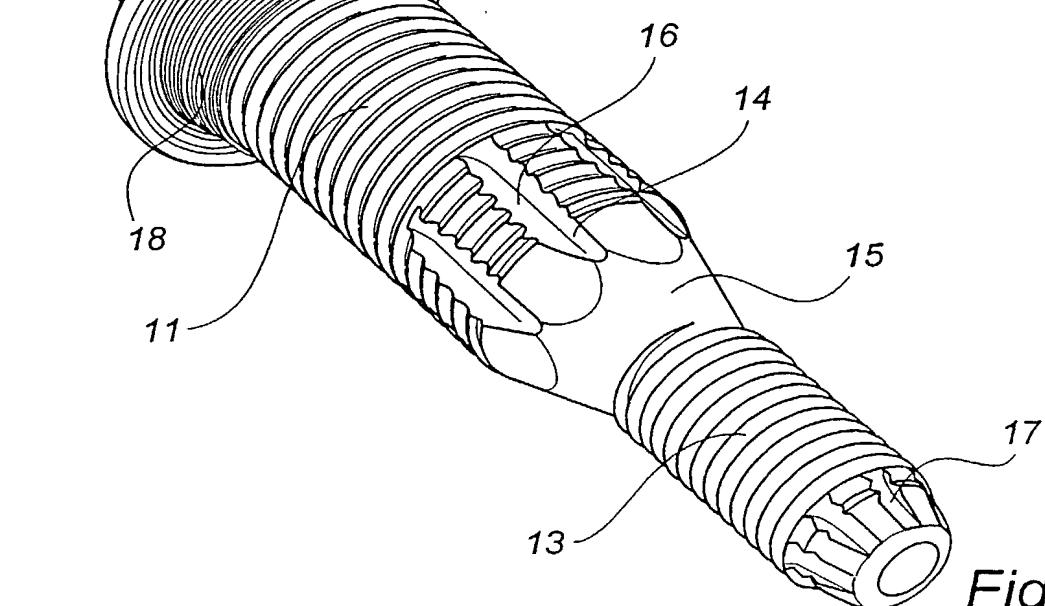
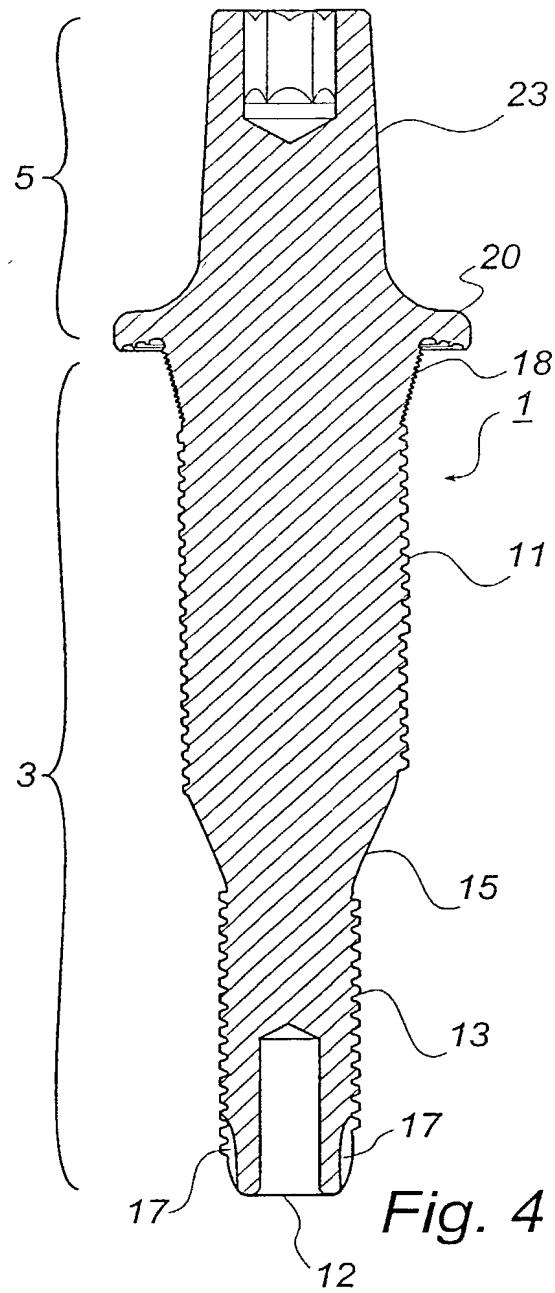
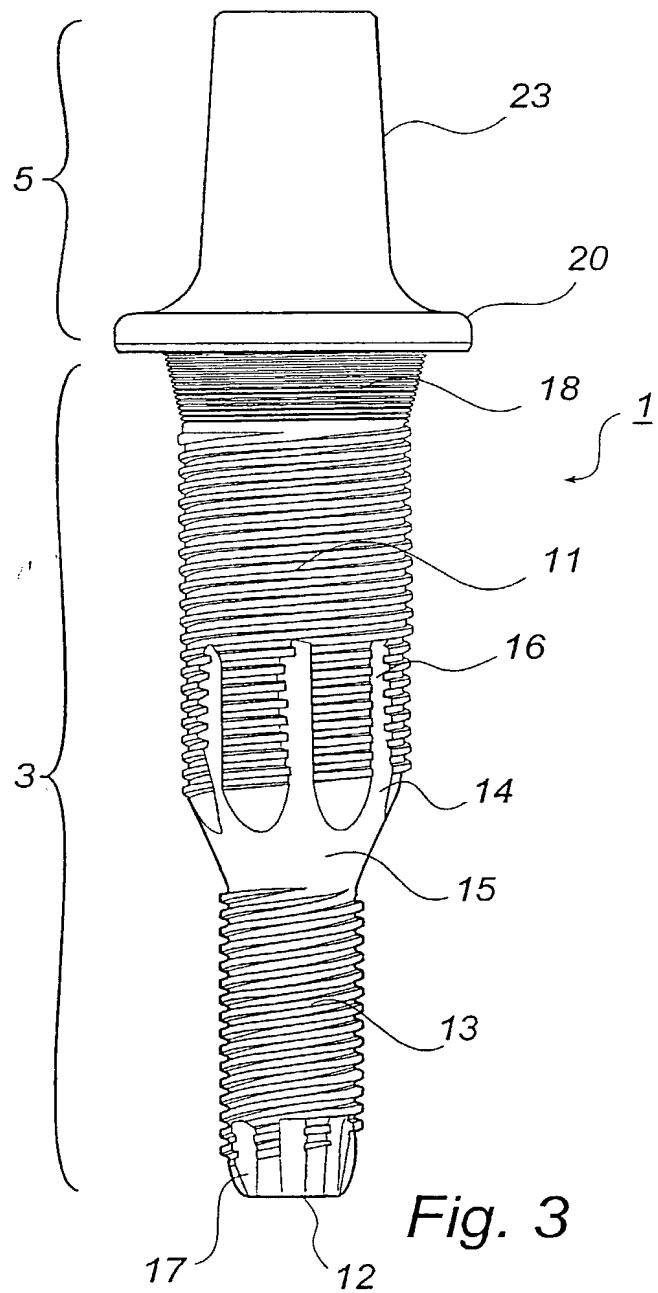


Fig. 2

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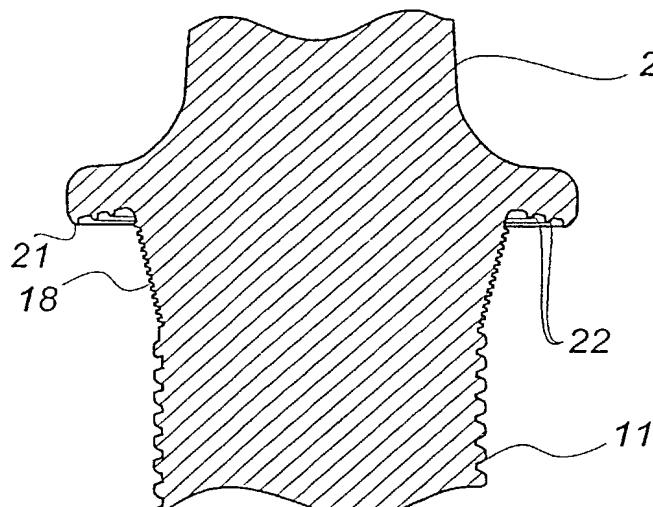


Fig. 5

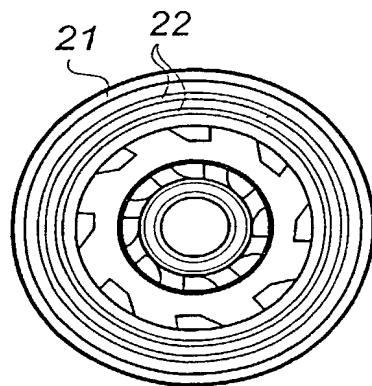


Fig. 6

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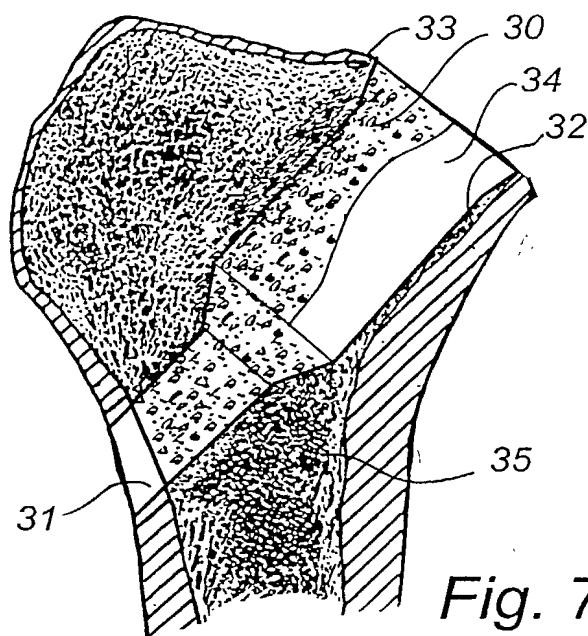


Fig. 7

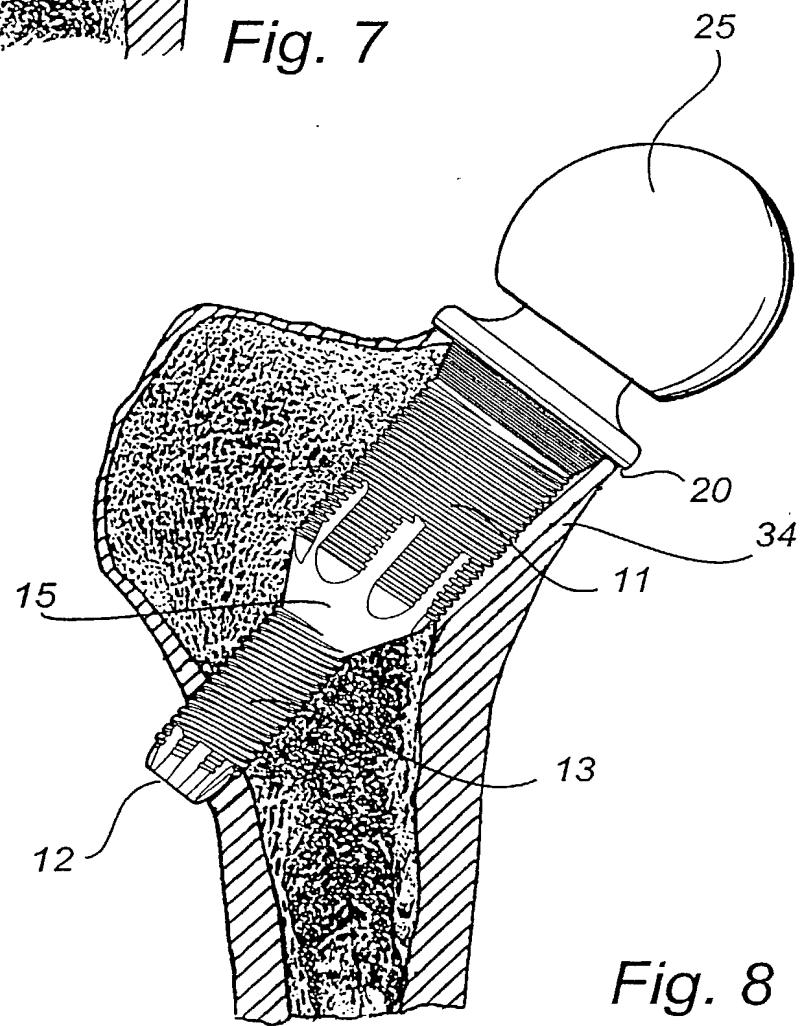


Fig. 8

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As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated next to my name, that I verify believe that I am the original, first and sole inventor (if only one inventor is named below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Insert Title:

FEMUR FIXTURE AND SET OF FEMUR FIXTURES

Fill in Appropriate
Information -
For Use Without
Specification
Attached:

the specification of which is attached hereto. If not attached hereto,
the specification was filed on _____ as
United States Application Number _____
and amended on _____ (if applicable) and/or
the specification was filed on _____ as PCT
International Application Number PCT/SE00/01945 _____; and was
amended on APRIL 4, 2002 (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representative or assigns more than twelve months (six months for designs) prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Insert Priority
Information:
(if appropriate)

Prior Foreign Application(s)		Priority Claimed
9903612-1 (Number)	SWEDEN (Country)	10/06/1999 (Month/Day/Year Filed) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
9903607-1 (Number)	SWEDEN (Country)	10/06/1999 (Month/Day/Year Filed) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
(Number)	(Country)	 (Month/Day/Year Filed) <input type="checkbox"/> Yes <input type="checkbox"/> No
(Number)	(Country)	 (Month/Day/Year Filed) <input type="checkbox"/> Yes <input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional applications(s) listed below.

Insert Provisional
Application(s)
(if any)

<u>(Application Number)</u>	<u>(Filing Date)</u>
<u>(Application Number)</u>	<u>(Filing Date)</u>

All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More than 12 Months (6 Months for Designs) Prior to the Filing Date of This Application:

Insert Requested
Information:
(if appropriate)

Country	Application Number	Date of Filing (Month/Day/Year)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States and/or PCT application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States and/or PCT application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application

Insert Prior U.S.
Application(s)
(if any)

<u>(Application Number)</u>	<u>(Filing Date)</u>	<u>(Status - patented, pending, abandoned)</u>
<u>(Application Number)</u>	<u>(Filing Date)</u>	<u>(Status - patented, pending, abandoned)</u>

I hereby appoint the practitioners at **CUSTOMER NO. 2292** as my attorneys or agents to prosecute this application and/or an international application based on this application and to transact all business in the United States Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the practitioners, unless the inventor(s) or assignee provides said practitioners with a written notice to the contrary:

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PLEASE NOTE:
YOU MUST
COMPLETE
THE
FOLLOWING:
↓

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Insert Date This
Document is Signed
→

Insert Residence
Insert Citizenship
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Address
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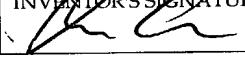
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Inventor, if any:
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Full Name of Third
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